Claims

1. (currently amended) A method for rendering an object associated with an image with high resolution lighting characteristics in real time during a video presentation, comprising:

generating a texture map associated with the image, the texture map defined by texels, ~~wherein each of the texels are capable of having one of a one to many correspondence with respective pixels or a many to one correspondence with a single pixel~~;

calculating a value representing a lighting characteristic for each of the texels by sampling a center point of the texel; the calculating including,

determining a direct illumination transfer function through a biased approximator for a point of the object in real time; and

determining a secondary lighting contribution in real time, the secondary lighting contribution identified through a series of multiply and add operations, resulting in coefficients that represent surface reflectance; and

combining the coefficients that represent the surface reflectance with the direct illumination transfer function to render the lighting characteristic;

storing the value;

associating a coordinate space of the texture map with a display screen coordinate space; and

rendering the image on a display screen using the stored value.

2. (previously presented) The method of claim 1, wherein the method operation of calculating a value representing a lighting characteristic for each of the texels includes,

determining visibility from the center point associated with one of the texels; and

determining a distribution of an incoming light ray.

3. (original) The method of claim 2, wherein an occlusion function is applied to determine the visibility and ray tracing is applied to determine the distribution of incoming light.

4. (original) The method of claim 1, wherein the method operation of calculating a value representing a lighting characteristic for each of the texels includes,

defining an image associated with a first resolution; and

applying a basis function to determine the value.

5. (original) The method of claim 4, wherein the value is represented by multiple coefficients.

6. (original) The method of claim 4, wherein the image on the display screen is associated with a second resolution, the second resolution being less than the first resolution.

7. (original) The method of claim 4, wherein the method operation of applying a basis function to determine the value includes,

executing a transfer function to yield the value.

8. (currently amended) A method for incorporating lighting characteristics of an image of an object into a texture map for display in real time during a video presentation, comprising:

defining a texture map associated with the image;

determining a lighting characteristic associated with a texel of the texture map by sampling a center point of the texel~~, wherein the texel is capable of having one of a one to many correspondence to respective pixels or a many to one correspondence to a single pixel~~ the determining including,

determining a direct illumination transfer function through a biased approximator for a point of the object in real time; and

determining a secondary lighting contribution in real time, the secondary lighting contribution identified through a series of multiply and add operations, resulting in coefficients that represent surface reflectance;

combining the coefficients that represent the surface reflectance with the direct illumination transfer function to render the lighting characteristic; ~~and~~

associating the texel with the lighting characteristic; and

displaying the image of the object according to the lighting characteristic.

9. (currently amended) The method of claim 8, wherein the method operation of determining a lighting characteristic associated with a texel of the texture map includes,

identifying a point on the object associated with the image; and

calculating ~~a coefficient representing the lighting characteristic~~ the coefficients through the application of a basis function with the center point.

10. (cancelled)

11. (currently amended) The method of claim 8 ~~10~~, wherein the image on the display screen is associated with a first resolution of a model of the object and the image is associated with a second resolution of the model of the object, wherein the first resolution is less than the second resolution.

12. (original) The method of claim 8, wherein the lighting characteristic includes both self shadowing and self interreflection components.

13. (previously presented) The method of claim 8, wherein the method operation of determining a lighting characteristic associated with a texel of the texture map includes,

calculating the lighting characteristic in a manner such that an intensity of the lighting characteristic does not fluctuate when a light source is moved.

Claims 14- 25 (cancelled)

26. (currently amended) A computer readable medium having program instructions for incorporating lighting characteristics of an image associated with an object into a texture map for display in real time during a video presentation, comprising:

program instructions for defining a texture map associated with the image;

program instructions for determining a lighting characteristic associated with a texel of the texture map by sampling a center point of the texel~~, wherein the texel is capable of having one of a one to many correspondence to respective pixels or a many to one correspondence to a single pixel~~ the program instructions for determining including,

program instructions for determining a direct illumination transfer function through a biased approximator for a point of the object in real time; and

program instructions for determining a secondary lighting contribution in real time, the secondary lighting contribution identified through a series of multiply and add operations, resulting in coefficients that represent surface reflectance;

program instructions for combining the coefficients that represent the surface reflectance with the direct illumination transfer function to render the lighting characteristic; ~~and~~

program instructions for associating the texel with the lighting characteristic; and

program instructions for displaying the image of the object according to the lighting characteristic.

27. (currently amended) The computer readable medium of claim 26, wherein the program instructions for determining a lighting characteristic associated with a texel of the texture map includes,

program instructions for identifying a point on the object associated with the image and wherein the program instructions for determining the secondary lighting

contribution is based on the application of a spherical basis function with the center point of the texel~~; and~~

~~program instructions for calculating a coefficient representing the lighting characteristic through the application of a spherical basis function with the center point~~.

28. (original) The computer readable medium of claim 26, wherein the lighting characteristic includes both self shadowing and self interreflection components.

29. (original) The computer readable medium of claim 26, wherein the program instructions for determining a lighting characteristic associated with a texel of the texture map includes,

program instructions for calculating the lighting characteristic in a manner such that an intensity of the lighting characteristic does not fluctuate when a light source is moved.

Claims 30-35 (cancelled)

36. (currently amended) An integrated circuit, comprising:

a memory capable of storing data corresponding to a self shadow and self interreflection lighting characteristics associated with an image;

circuitry for accessing the data;

circuitry for determining an intensity associated with a pixel based upon a product of the data and an illumination value, the illumination value derived without calculating the lighting function at triangle corners, the circuitry for determining the intensity

including, ~~wherein the pixel is capable of having one of a one to many correspondence with respective texels associated with the pixel or a many to one correspondence with a single texel associated with the pixel~~;

circuitry for determining a direct illumination transfer function through a biased approximator for a point of the object in real time; and

circuitry for determining the self shadow and self interreflection lighting characteristics in real time during a video presentation through a series of multiply and add operations, resulting in the data that represent surface reflectance;

circuitry for combining the coefficients that represent the surface reflectance with the direct illumination transfer function to render the lighting characteristic; and

circuitry for enabling presentation of the intensity of the pixel on the display screen.

37. (previously presented) The integrated circuit of claim 36, wherein the image is associated with an object of a video game and the illumination value is derived by a transfer function that samples a center point of a texel of the object.

38. (original) The integrated circuit of claim 36, wherein the integrated circuit is incorporated into a video game console.

39. (original) The integrated circuit of claim 36, wherein the data is associated with a texel of a texture map stored in memory.

40. (original) The integrated circuit of claim 39, wherein a lookup table maps the texel to the pixel.